Conceptual Models of the Mission Space (CMMS)

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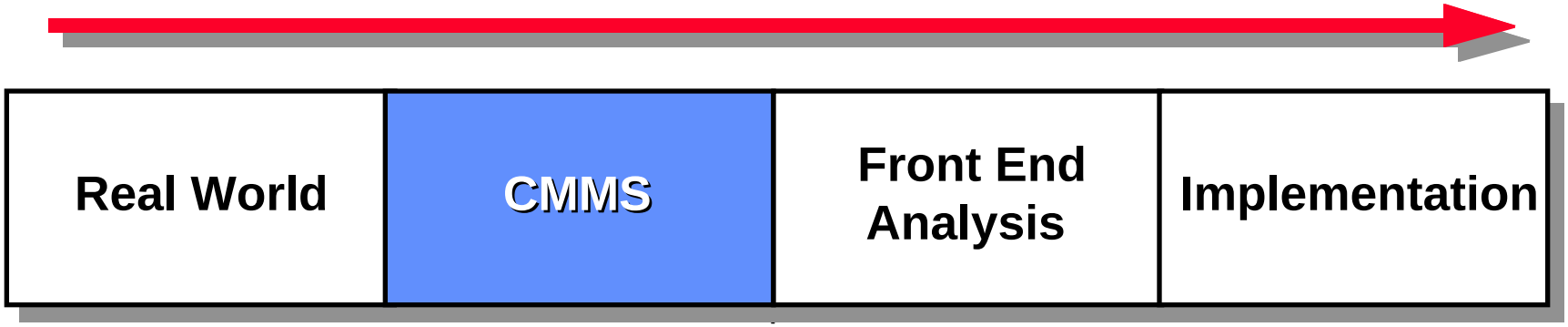
CMMS

Simulation Development Process

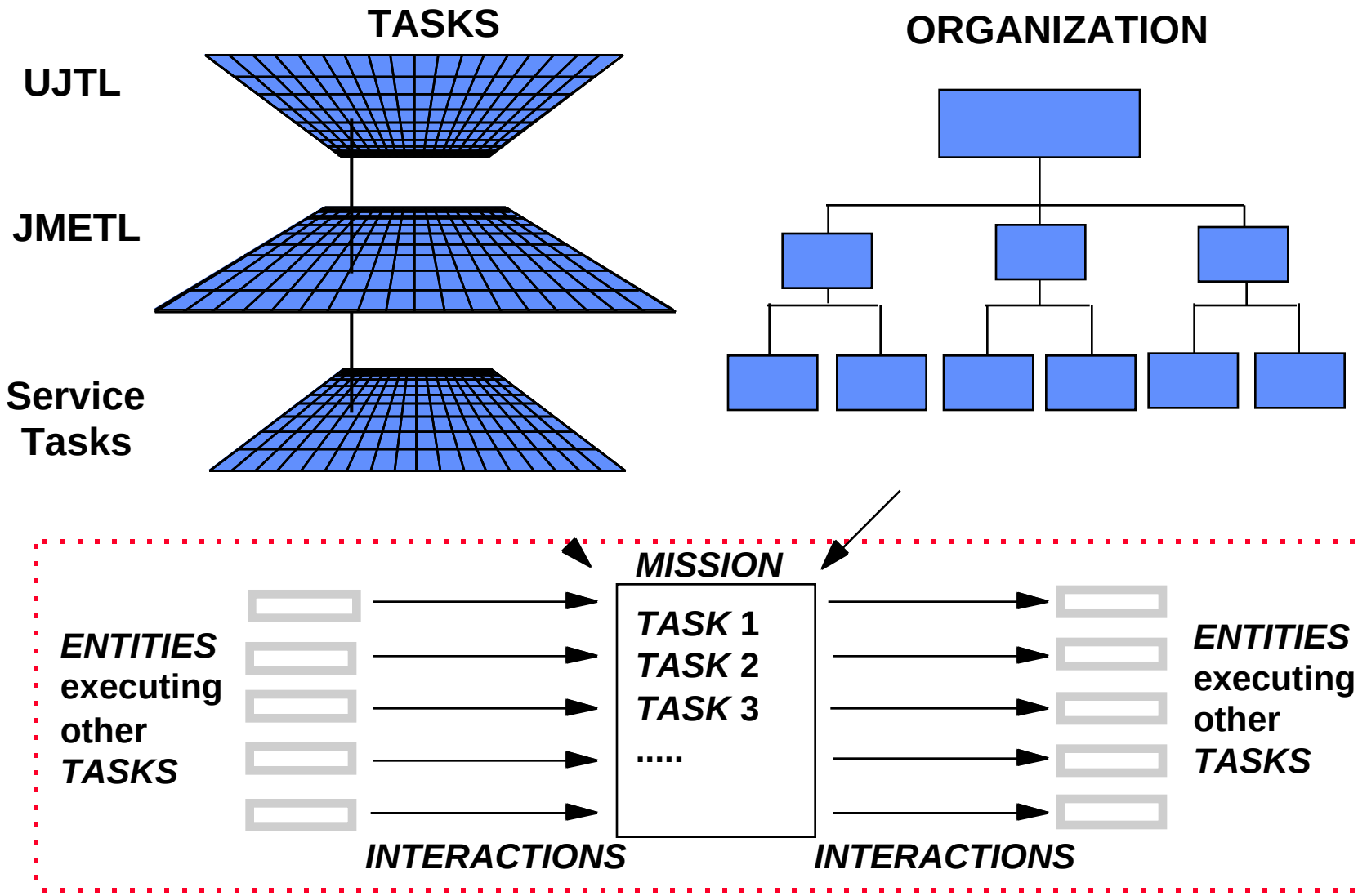


Every simulation developer builds something like a CMMS. The problem has been that they aren't authoritative and we throw them away.

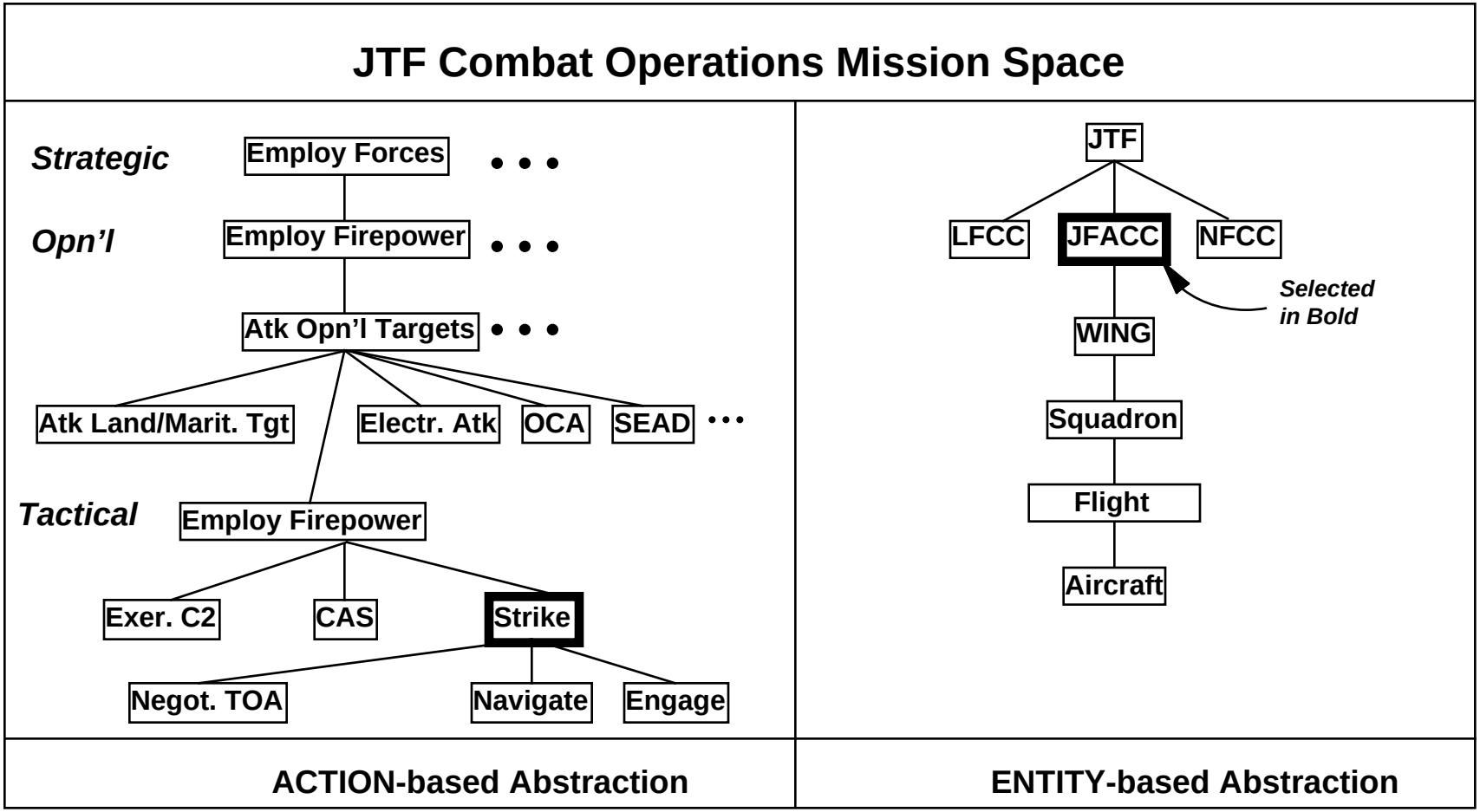
What is a CMMS?

- A hierarchical description of the actions and interactions among the various entities associated with a particular mission area
- An authoritative first abstraction of the real world
- A common framework for knowledge acquisition
  - Validated, relevant actions and interactions organized by specific task and entity/organization
  - Standard format for expression
- The purpose of CMMS is to cost-effectively provide simulation developers (and others) a common understanding of the real world

Organizational Concept



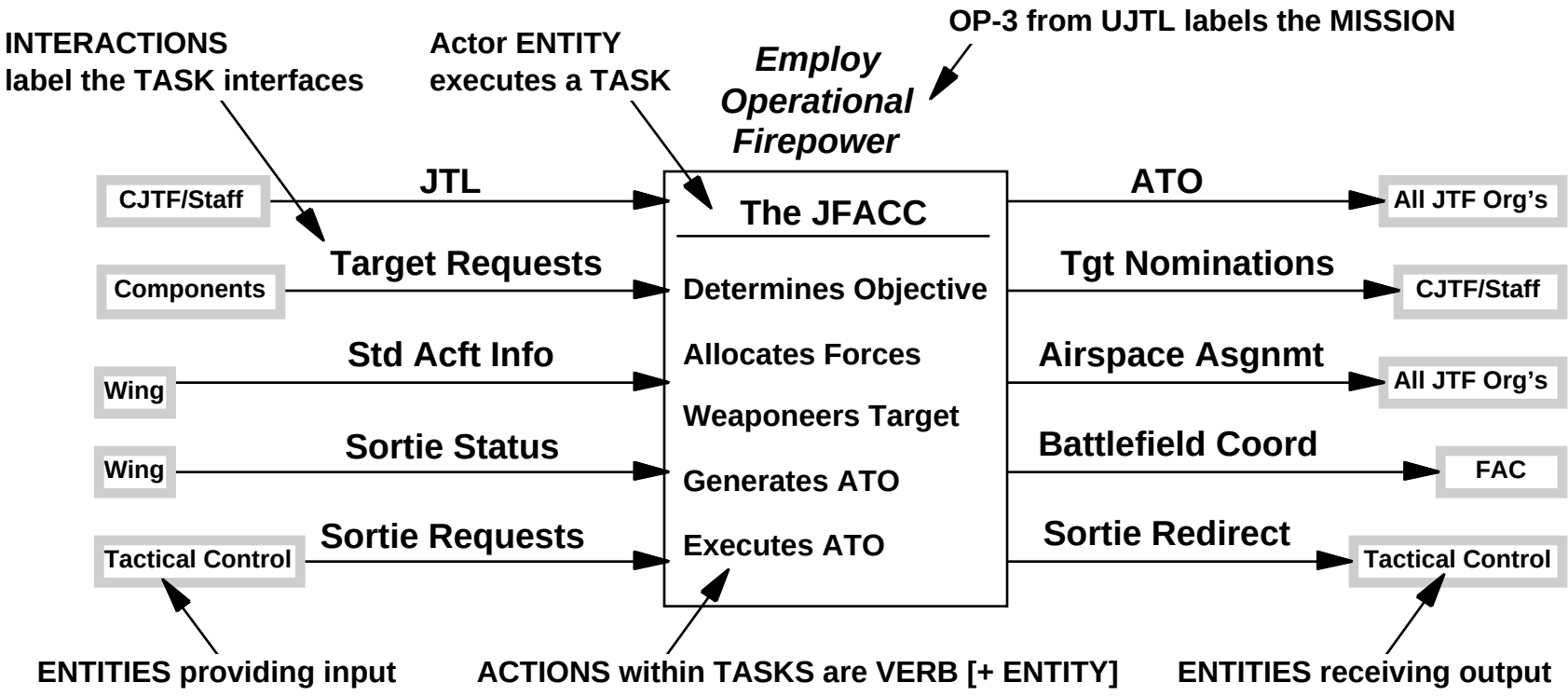
ACTION and ENTITY Selection Example



User Selects the ACTIONs Involved and allocates ENTITIES to execute these ACTIONS in the Strike Task by the JFACC ...

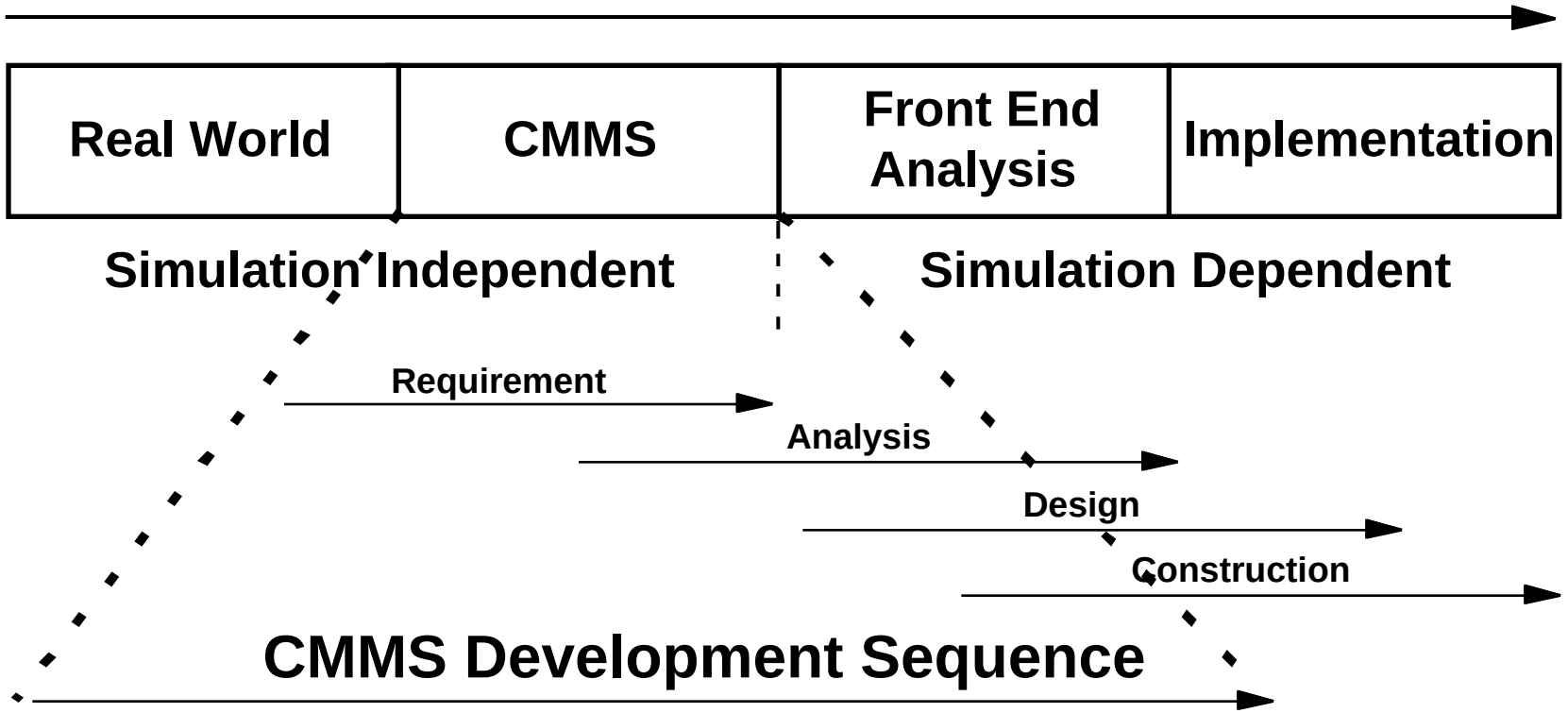
ENTITIES, ACTIONS, TASKS, and INTERACTIONS

JTF Combat Operations Mission Space



Template shows the JFACC tasks (e.g., JFACC generates ATO) along with inputs, outputs, and their interfaces

Simulation Development Sequence



Develop Focused Context	Gather Information	Organize Data	Develop Balanced Entity/Action based CMMS

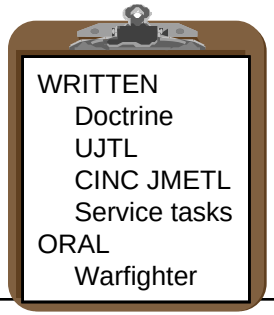
Issue: Is OOA CMMS or Front End Analysis?

CMMS Integration Points

CMMS Process/Tech Framework

Information Sources

Feedback to authoritative sources



KA Analysts

CAPTURED KNOWLEDGE

DIF

CMMS Users

USER INTERFACES
- Multiple user-requested views
  - Organization structure
  - Task structure
  - Model of interactions
  - Visualization of combat process
- Performance demands
  - Response time
  - Refresh rate
- User-friendliness

DATABASE
- CMMS elements:
  - Entities
  - Actions
  - Interactions
- Pointers to:
  - Knowledge acquisition history
  - Auth. sources
  - Applicable models and simulations

MANAGEMENT PROCESS/TOOLS
- CMMS element integration
- Warfighter approval
- Functional area mission space mgt
- Resource/tool management

KNOWLEDGE CONVERSION PROCESS/TOOLS
- Check source, format, content
- Extract CMMS elements
- Deficiency correction
- Tool guidance
- Store in temporary database
- Convert CMMS elements for export

CMMS Prototype 1 Cycle Lessons Learned

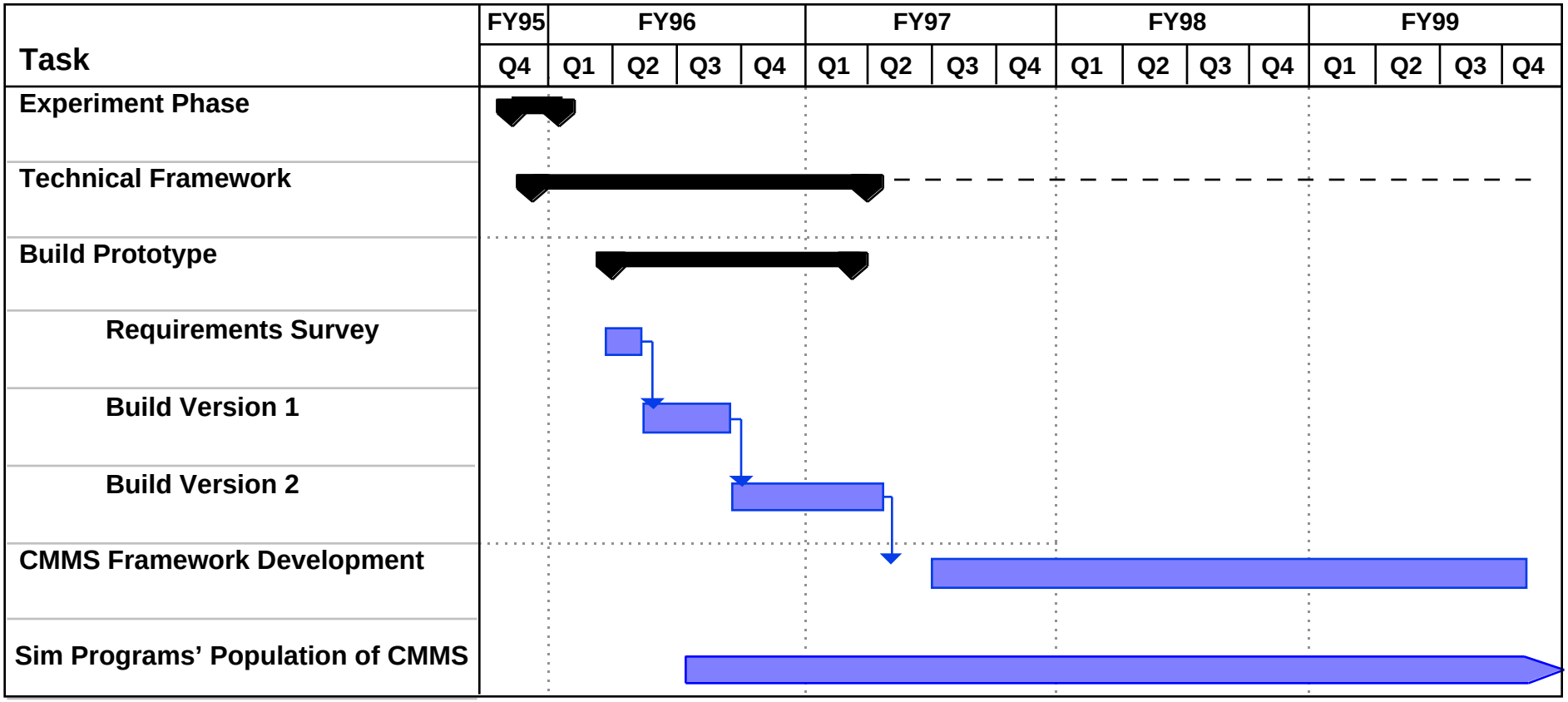
- No CSS, no integration
- DIF required for efficient conversion
- Export API's necessary to compliment import API's
- Is VV&A done prior to conversion and integration, after, or both?
- How are VV&C values aggregated?

CMMS Prototype Cycle 2

- Develop DIFs and improved conversion routines for existing programs
- Add functionality to capture additional elements in Technical Framework (e.g., conditions, sequencing)
- Add functionality to reflect new Technical Framework functions
- CMMS use-case by simulation developer

Long Range Schedule

CMMS Execution



Why Should I Care about the CMMS?

- Provides a direct link between the warfighter and the simulation developer for credible, trusted simulations
- Everybody doesn't have to do all Knowledge Acquisition by themselves--can reuse others' KA
- It forces use of authoritative data sources (Warfighter in control)
- Increases likelihood of interoperability with other simulations
- Useful for training and doctrine development, as well as simulation development
- Means to map M&S capabilities against real world
- Provides traceability for VV&A
- Means to alert developers of need for updates